OUT-OF-HOSPITAL Cardiac Arrest Registry

Summary Report 2019/20



WELLINGTON REE AMBULANCE

We are the ones. 111

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SUMMER BUSH WALK TURNS INTO A FIGHT FOR LIFE



As Shaun and his fiancé Chantal approached the end of Paekākāriki Escarpment Track in January last year, Shaun suddenly collapsed.

Screaming for help, not knowing if anyone could hear her – Shaun was in cardiac arrest and Chantal knew he needed help immediately. Fortunately Chris, also out walking the track, heard Chantal's calls for help.

Chris knew CPR thanks to our Lloyd Morrison Foundation Heartbeat training programme, and immediately dialled 111. Shaun was unresponsive and not breathing so the call taker instructed her to start chest compressions.

"I'd never done CPR on anyone before and didn't give it a second thought."

Two Wellington Free Ambulance crews were dispatched to the track immediately. Chantal wasn't sure if they would know her location but thankfully others had also heard her calls for help and directed our paramedics to Shaun.

"I can't describe my sense of relief when Chris came to help and the paramedics arrived. I knew Shaun was in good hands."

Paramedics Tash, Mal and Francis took over Shaun's clinical care to get his heart beating again.

"We don't often go to people of Shaun's young age having a cardiac arrest - regardless of a



Paramedics Tash, Francis (Shaun) and Mal.



Shaun and Chantal with their son.

patient's age, the sooner we get to them the better the outcome," Francis explains.

"It's the important things in a cardiac arrest that matter; ensuring CPR is started as soon as possible and early defibrillation – fortunately that's all we had to do. Chris had already done an amazing job," Mal adds.

The team worked quickly and efficiently – after about 20 minutes of collective CPR and one shock from the defibrillator, Shaun's heart started again.

"I remember they told me Shaun was alive but still very sick. Chris had done everything she could for Shaun and then looked after me, 'I was a mess'. I knew it was now over to the paramedics," Chantal says.

With Shaun's life still on the line, Paramedics Tash, Mal and Francis needed to get Shaun to hospital.

"We all had a common goal and worked together to achieve a good outcome," Mal says.

Shaun made a full recovery. He can't remember anything that happened but is thankful to be alive. "Every day is a blessing, I'm forever grateful to those who helped me."

"It's crazy to think that it could have been a totally different outcome if Chris and Wellington Free Ambulance hadn't been there that day," Chantal adds.

ABOUT THIS REPORT

Cardiac arrest remains a considerable public health issue, with ischaemic heart disease being the second most prevalent cause of death in New Zealand.

Internationally, survival rates following out-of-hospital cardiac arrest (OHCA) are highly variable and can range from less than 6% to greater than 50%. Benchmarking survival from OHCA is a key measure of the clinical quality of an Emergency Ambulance Service (EAS) and is fundamental to making improvements in OHCA survival. Knowledge of New Zealand OHCA outcomes is a key driver to help identify and address areas for improvement in clinical care.

The data presented in this report is for all OHCA attended by the Wellington Free

Ambulance EAS in the period from 1 July 2019 to 30 June 2020.

The data presented in this report primarily relates to events that were either 'attended' or where there was a 'resuscitation attempted' by EAS personnel. 'Attended' refers to all OHCA where EAS personnel arrived at the scene regardless of whether or not a resuscitation attempt was made. 'Resuscitation attempted' refers only to those events where an attempt at resuscitation was made by EAS personnel.

Unless otherwise stated, all analyses exclude cardiac arrests witnessed by EAS personnel. In cases where it was not recorded whether the patient was an adult or a child, the patient was assumed to be an adult and was included in that category.

Unless otherwise stated, survival refers to survival to 30 days post cardiac arrest.



EXECUTIVE SUMMARY



All events, adult, resuscitation attempted: includes adults (≥ 15 years old), all-cause, resuscitation attempted. Excludes children, and EAS personnel witnessed events.

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BENCHMARKING EXECUTIVE SUMMARY

Key figures for all-cause events

Table 1: Key figures for all-cause events^A

Year	Total number events	% Bystander CPR	% Community Responder AED use	Urban median response time	Rural & remote median response time	% Attended by Fire & Emergency New Zealand	% ROSC on handover	♣ ♣ % Survival
2018/19	204	76	6	8	14	93	32	19
2019/20	209	77	6	9	14	94	32	16

Benchmarking (all-cause events)

The outcomes of OHCA for international benchmarking compare rates of ROSC sustained to hospital handover and survival. This group requires that the following criteria be met: includes adults (\geq 15 years old), all-cause, resuscitation attempted. Excludes children, and EAS personnel witnessed events.

Ambulance Service	Collection period	Total number events	% ROSC on handover	% Survival [₿]
Wellington Free Ambulance	1 July 2019 to 30 June 2020	209	32%	16%
St John New Zealand	1 July 2019 to 30 June 2020	2,003	25%	12%
Ambulance Victoria ¹	1 July 2019 to 30 June 2020	_	28%	10%
Queensland Ambulance Service ²	1 January 2019 to 31 December 2019	2,210	31%	14%
St John Western Australia ³	1 July 2019 to 30 June 2020	902	19%	11%
King County EMS ⁴	1 July 2019 to 30 June 2020	895	43%	16%



A All events, adult, resuscitation attempted: includes adults (≥ 15 years old), all-cause, resuscitation attempted. Excludes children, and EAS personnel witnessed events.

B Wellington Free Ambulance, St John New Zealand and Queensland Ambulance Service report on survival to 30-days, all other services report survival to hospital discharge.

Benchmarking (Utstein Comparator Group)^A

The outcomes of OHCA for international benchmarking compare rates of ROSC sustained to hospital handover and survival for a specifically selected subgroup of patients. This subgroup is referred to as the Utstein Comparator Group and requires that the following criteria be met: includes adults (≥15 years old), all-cause, resuscitation attempted, shockable presenting rhythm and bystander witnessed. Excludes children, EAS witnessed and no resuscitation attempt.

Ambulance Service	Collection period	Total number events	% ROSC on handover	% Survival [₿]
Wellington Free Ambulance	1 July 2019 to 30 June 2020	69	55%	38%
St John New Zealand	1 July 2019 to 30 June 2020	568	48%	31%
Ambulance Victoria ¹	1 July 2019 to 30 June 2020	_	-	37%
Queensland Ambulance Service ²	1 January 2019 to 31 December 2019	335	51%	35%
St John Western Australia³	1 July 2019 to 30 June 2020	197	44%	36%
King County EMS ⁴	1 July 2019 to 30 June 2020	153	75%	48%

Table 3: Benchmarking survival outcomes for adults. (Utstein Comparator Group)^A.



A Utstein Comparator Group: includes adults (≥ 15 years old), all-cause, resuscitation attempted, shockable presenting rhythm and bystander witnessed. Excludes children, EAS witnessed and no resuscitation attempt.
 B Wellington Free Ambulance, St John New Zealand, and Queensland Ambulance Service report on survival to 30-days, all other services report survival to hospital discharge.



APPENDICES

THE WELLINGTON FREE AMBULANCE OUT-OF-HOSPITAL CARDIAC ARREST REGISTRY

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Eligibility

Wellington Free Ambulance captures data on all OHCA events attended by the EAS. A cardiac arrest is defined as a patient who is unconscious and pulseless with either agonal breathing or no breathing.

Inclusion and exclusion criteria are described in Table A1 and Table A2.

Data capture

The data is collated in the registry using a reporting template based on international definitions outlined in the Utstein style of reporting and the variables developed by the Australian Resuscitation Outcomes Consortium (Aus-ROC).

In the data collection process there are three separate points where data is acquired:

- Computer Aided Dispatch (CAD) and supporting systems
- On scene by the EAS personnel in attendance
- Mortality data from the New Zealand National Health Index (NHI) records.

Computer aided dispatch

Patient and event details are collected by the Ambulance Communications Centre when a 111 call is received and an ambulance is dispatched, with data being entered into the CAD system. Data specifically related to cardiac arrest is obtained from the CAD system and transferred into the OHCA Registry.

Table A1: Inclusion criteria (all of the following).

- Patients of all ages who suffer a documented
cardiac arrest
- Occurs in New Zealand where Wellington FreeAmbulance or one of its participating co
 - responders is the primary treatment provider
 - Patients of all ages who on arrival of the EAS are unconscious and pulseless with either agonal breathing or no breathing or
 - Patients of all ages who become unconscious and pulseless with either agonal breathing
 - or no breathing in the presence of EAS personnel or
 - Patients who have a pulse on arrival of EAS personnel following successful bystander defibrillation.

Table A2: Exclusion criteria (any of the following).

Patients who suffer a cardiac arrest in a hospital 1 facility where EAS may be in attendance but are not the primary treatment providers Patients who suffer a cardiac arrest during an inter-hospital transfer where EAS may be 2 providing transport but are not the primary treatment providers Bystander suspected cardiac arrest where the patient is not in cardiac arrest on arrival of the EAS personnel, and where defibrillation did not 3 occur prior to ambulance arrival or no other evidence verifying a cardiac arrest state is present Patients who suffer a cardiac arrest where St John is the primary treatment provider

On scene collection

Ambulance officers on scene attending a patient in cardiac arrest are required to record specific data. This is recorded on an electronic Patient Report Form (ePRF) and submitted electronically to a secure server.

NHI patient outcome data

The patient's NHI is collected by EAS personnel on scene or at hospital handover. If the NHI was not available at the time of the event then the NHI is determined by cross-reference of the patient's date of birth and name to the NHI database.

The date of death is updated by the Ministry of Health identity data management team after matching NHI identity with the official death registrations on a monthly basis.

Data quality

The registry is subject to quality improvement processes which involve continual auditing of existing data and updating of the registry entries as appropriate. Registry reports are generated on a monthly and quarterly basis and these are analysed for variances in the numbers of cases and patient outcomes. These results are compared with international data from EAS that are similar to Wellington Free Ambulance.

Ethical review

The OHCA Registry has been approved by the New Zealand Health and Disability Ethics Committee (Ethics reference: 19/NTB/187).

The registry is also subject to EAS internal research governance processes that include a locality review and locality authorisation as per the Standard Operating Procedures for Health and Disability Ethics Committees.

The OHCA Registry is held on a secure server which requires active directory permissions. At no stage is data that could identify individual patients or individual hospitals released from this registry.



ABBREVIATIONS

AED	Automated external defibrillator
CAD	Computer aided dispatch
CPR	Cardiopulmonary resuscitation
EAS	Emergency ambulance service

EMS	Emergency medical services
онса	Out-of-hospital cardiac arrest
ROSC	Return of spontaneous circulation

GLOSSARY OF TERMS

Adult	Patients aged 15 years or older.		
Children	Patients aged less than 15 years.		
Community responder	A member of the community who is not part of the EAS service who provides assistance at an OHCA event for example, a member of the public, or an off duty ambulance officer or an off duty doctor or nurse.		
EAS attended	This is the population of all patients following cardiac arrest where EAS personnel attended regardless of whether emergency treatment was provided.		
EAS personnel	Where EAS personnel respond to a medical emergency in an operational capacity as part of an organised medical response team.		
Presumed cardiac aetiology	An OHCA is presumed to be of cardiac aetiology, unless it is known or likely to have been caused by trauma, drowning, poisoning or any other non-cardiac cause.		
Resuscitation attempted	The performance of CPR by or under the direction of responding EAS personnel, or the delivery of a shock at any time (including before ambulance arrival).		
Return of spontaneous circulation	The patient shows clear signs of life in the absence of chest compressions for more than 30 seconds. Signs of life include any of the following: normal breathing, palpable pulse, normal end tidal CO_2 or active movement.		

Rural and remote	Includes:				
service area	Minor urban area: centred on smaller towns with a population between 1,000 and 9,999.				
	and				
	Rural centre: rural settlements or townships with population between 300 and 999.				
	and				
	Other: areas not classified as urban or rural centres with population under 300.				
	(http://nzdotstat.stats.govt.nz/wbos/Index.aspx)				
Shockable rhythm	Ventricular fibrillation, ventricular tachycardia or unknown shockable (AED).				
Specific rates	Rates for specific segments/groups of the population (e.g. sex, age, ethnicity)				
Survival to 30- days	The patient is alive at 30-days post-OHCA event.				
Survived event	The patient has sustained ROSC to handover at hospital.				
Urban area	Includes:				
	Main urban area: centred on a city or major urban area with a minimum population of 30,000.				
	and				
	Secondary urban area: centred on large regional centres with a population between 10,000 and 29,999.				
	(http://nzdotstat.stats.govt.nz/wbos/Index.aspx)				
Witnessed event	A witnessed cardiac arrest is one that is seen or heard by another person.				

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